

## A sampling plan for secretive marshbirds

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### Background

A contract under the Science Support Program (SSP) was arranged with J. Bart at the Forest and Rangeland Ecosystem Science Center, and Courtney Conway in the Arizona Cooperative Research Units program to design a sampling plan for marshbirds and implement it on National Wildlife Refuges. The products were described as follows:

A detailed sampling frame and sampling plan, with extensive examples, for the marshbird monitoring program. Implementation of a national marshbird monitoring program on National Wildlife Refuges. Peer-reviewed publications addressing methodological issues associated with marshbird monitoring.

Bart was responsible for designing the sampling frame; Conway was responsible for developing the survey methods and implementing them on National Wildlife Refuges. This report summarizes the work done by Bart on developing a sampling frame for the marshbird survey. A companion contract was arranged to develop a sampling frame for migrating shorebirds. Some of the products described below pertain to both groups, secretive marshbirds (during the breeding season) and migrating shorebirds.

### Geographic Scope and Species Covered

The geographic scope of the sampling plan is the contiguous United States. Marshbird specialists in Canada are aware of this project and are waiting for its completion to decide whether to undertake similar work in Canada. At a meeting in July 2004, we agreed that, for the purposes of this project, “secretive marshbirds” would include the species listed in Table 1.

Table 1. High and medium priority species in designing the sampling frame for secretive marshbirds.

High priority species	Medium priority species
Clapper rail	Limpkin
King rail	Common snipe
Sora	Nelson’s sharp-tailed sparrow
Virginia rail	Seaside sparrow
Black rail	Marshwren
Yellow rail	LeConte’s sparrow
American coot	Anhinga
Purple gallinule	
Common moorhen	
Pied-billed grebe	
Least bittern	
American bittern	

## Description of the Proposed Sampling Frame

The sampling frame is hierarchical and includes the following “levels”:

Level One: Bird monitoring region

Level Two: Stratum within a bird monitoring region

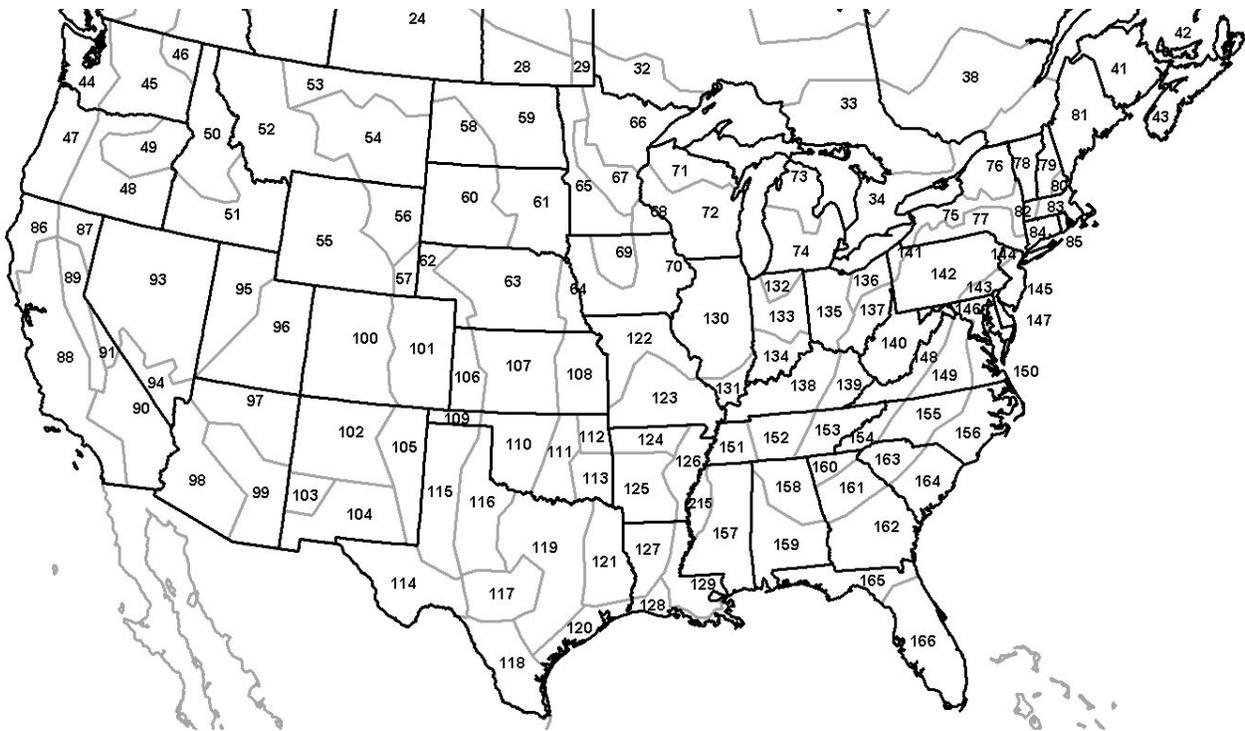
Level Three: Specific site, plot, or area within a level-two stratum

Additional levels as needed

Bird Monitoring Regions (BMRs, Fig. 1) were defined throughout Canada and the US by intersecting a Bird Conservation Regions (BCR) map with a Provinces and States map. We deleted small polygons and smoothed the BCR boundaries to make them easier to locate on the ground. The resulting BMRs permit aggregating results to either the BCR or Province and State level and to any larger level that uses these sub-divisions.

Within each BMR, two or more strata were delineated. Stratum 1 consists of “designated sites”, sites that support significant numbers of aquatic birds and that would probably be surveyed in a comprehensive aquatic bird survey. Examples include National Wildlife Refuges, State Game management areas if biologists are available to survey them, and other areas that are notable for aquatic birds and that volunteers could probably be found to survey. Designated sites are numbered sequentially within BMRs.

Fig. 1. Bird monitoring regions in the 48 contiguous States.



The rest of each BMR is referred to as the matrix. It was sometimes divided into 2 or more “matrix strata”. For example, one part of the matrix might support numerous aquatic species whereas the rest of it might have very few aquatic species. These two regions would probably be distinguished as two separate matrix strata. If the matrix stratum consists of well-defined sites, such as reservoirs or other water bodies, they may be numbered sequentially to facilitate development of a sampling plan for the stratum. The distinction between designated sites and individually-numbered sites in a matrix stratum is that all designated sites will be surveyed whereas only a (random) sample of the sites in matrix strata will be surveyed. We attempted to identify all major sites for any aquatic species, so that we would have a comprehensive list and not have to refine it as sampling plans are developed for other groups of aquatic birds. In producing the reports, however, we identified which sites were particularly important for secretive marshbirds (Fig. 2) during the breeding season.

Fig. 2. Designated sites with significant populations of secretive marshbirds



### **Next steps: Using the Sampling Frame to Develop a Sampling Plan**

The next step in developing a monitoring program for secretive marshbirds is for a group of marshbird specialists, working at either the regional, national, or continental level to agree to develop a coordinated monitoring program. Such groups need to carefully assess their resources, decide approximately how many sites they can survey and where and how the data will be managed. Once these decisions are made, then the State reports should be reviewed and final decisions should be made - consistent with availability of resources - on the definitions of designated sites and matrix strata of interest. These decisions, however, cannot usefully be made until some estimate of resources available for the survey is available. For example, a region might have 50 sites with breeding secretive marshbirds. If substantial resources were available

then most or all of them might be classified as designated sites (in which case each one would be surveyed). Alternatively, if resources were much more limited, then the five most important might be classified as designated sites and all the rest might be consigned to matrix strata. A random sample (e.g., of 10) of these sites could then be selected for the surveys.

Once the designated sites have been identified, it is helpful to prepare a “site description” for each one. The site description provides more detailed information about the site including ownership, access issues, where the good habitat is located, what species occur and at what times of year, and how surveys might best be conducted. I recommend preparing these as general descriptions - not just as descriptions of the secretive marshbirds - so that they will be available when other surveys are designed. Detailed guidelines have been developed for writing site descriptions and have been used widely across the United States. Guidelines have also been developed for designing short-term monitoring projects (see Summary of Products below).

The final step in designing the sampling program is to prepare detailed maps and descriptions of how survey locations were selected and how surveys at these locations are to be conducted. This description is specific to the focal group and time of year surveys are conducted, and it may be changed as resources available for the survey change.

Some States have chosen to incorporate all of this material into a “Coordinated Bird Monitoring” Plan which describes existing surveys, specifies short, medium, and long-term bird monitoring projects, and contains the site descriptions for designated sites.

Data management for these surveys will require careful attention. While it was not within the scope of the SSP project to design detailed recommendations for data management, considerable progress has been made in this arena during the past few years. Anyone interested in this area may contact me directly.

### **Summary of products**

The products below describe the sampling frame and related issues that will require consideration in developing the marshbird monitoring program. All are available on the FRESC web site (<http://amap.wr.usgs.gov>). Courtney Conway has produced other products describing the field methods and his program on the National Wildlife Refuges.

Aquatic Bird Sampling Frame Reports (*one report per State; Minnesota's report is not yet done*)

Bart, J. 2005. Final report: Development of a sampling plan for secretive marshbirds (*this document*)

Bart J. Design of short-term bird monitoring programs. 2005. In Ralph, C.J. and T. R. Rich (eds.). Proceedings of the 3d Partners in Flight International Symposium. *In press. (May be helpful as groups consider what sort of secretive marshbird monitoring program to initiate)*

Bart, J. 2005. Monitoring the abundance of bird populations. *Auk* 122:15-25. (*An overview of the current status of bird monitoring programs including secretive marshbirds*)

Bart, J., A. Manning, S. Thomas, and C. Wightman. 2005. Preparation of Regional Shorebird Monitoring Plans. *In* Ralph, C.J. and T. R. Rich (eds.). Proceedings of the 3d Partners in Flight International Symposium. *In press*. (*Note: this report focuses on shorebirds but the procedures it describes pertain equally well to secretive marshbirds*)

Bart, J. and C.J. Ralph. 2005. Coordinated bird monitoring. *In* Ralph, C.J. and T. R. Rich (eds.). Proceedings of the 3d Partners in Flight International Symposium. *In press*. (*A general description of CBM of which secretive marshbird monitoring is a part*)

Wightman, C. and J. Bart. 2005. Preparation of Aquatic Site Descriptions. *In* Ralph, C.J. and T. R. Rich (eds.). Proceedings of the 3d Partners in Flight International Symposium. *In press*.

Links to State CBM plans (include designated site descriptions)

Idaho	<a href="http://amap.wr.usgs.gov/public_docs/ibis%20plan%20text%20only.pdf">http://amap.wr.usgs.gov/public_docs/ibis%20plan%20text%20only.pdf</a>
Nevada	<a href="http://www.gbbo.org/pdf/NV_Plan_12_noAppC_textonly.pdf">http://www.gbbo.org/pdf/NV_Plan_12_noAppC_textonly.pdf</a>
Utah	Contact Frank Howe at <a href="mailto:frankhowe@utah.gov">frankhowe@utah.gov</a>
Montana	<a href="http://www.avianscience.org/research_coordinated.htm">http://www.avianscience.org/research_coordinated.htm</a>
Colorado	Contact David Hanni at <a href="mailto:david.hanni@rmbo.org">david.hanni@rmbo.org</a>
New Jersey	Contact Sharon DeFalco at <a href="mailto:sharon.defalco@dep.state.nj.us">sharon.defalco@dep.state.nj.us</a>